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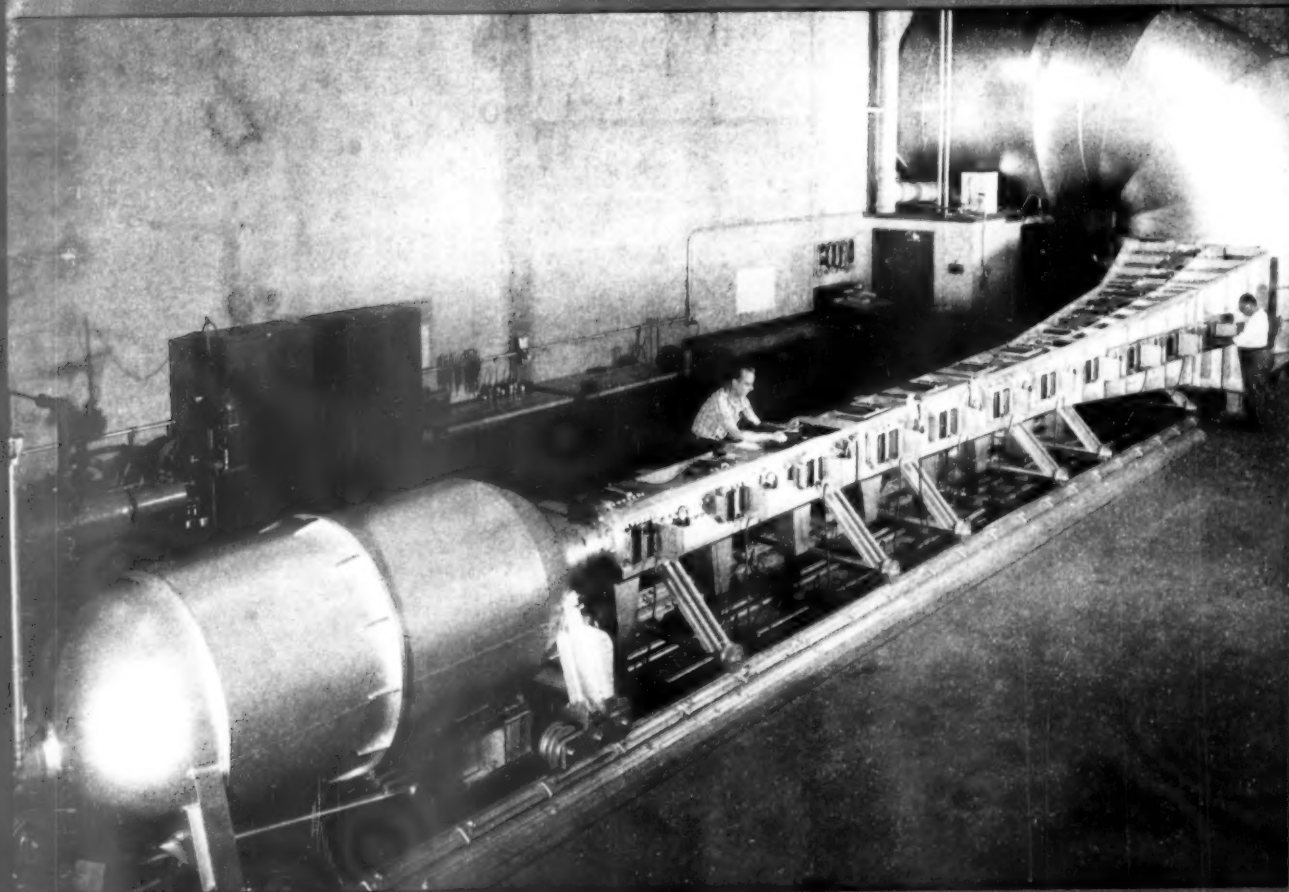
July 26, 1958

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

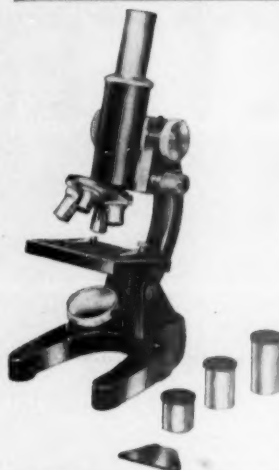


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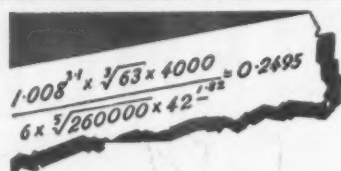
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ROCKETS AND MISSILES

Rocket Research Lost Year

Rulings by the Bureau of the Budget and orders by high defense officials are said to have caused at least one year's delay in the nation's atomic missile research program.

► AMERICA'S basic research program to develop nuclear-powered engines for inter-continental ballistic missiles (ICBM) or space rockets was retarded a full year by a personal order of former Secretary of Defense Charles Wilson and an "unrealistic ruling" by the Bureau of the Budget, the joint Congressional Committee on Atomic Energy was told in secret testimony just released.

The Atomic Energy Commission first had been urged by the Defense Department to proceed "promptly" on research toward a nuclear rocket. Then Secretary Wilson suggested to former AEC Chairman Lewis Strauss that the research be conducted on a "moderate scale" without a target date for tests, the heavily censored transcript of hearings begun Jan. 22, 1958, reveals.

Col. Jack Armstrong, deputy chief of the AEC Aircraft Reactors Branch, and Sen. Clinton P. Anderson (D-N. M.), chairman of the special subcommittee on outer space propulsion, agreed the Administration decisions lost us at least a year of vitally needed work, especially in basic research.

Sen. Anderson told SCIENCE SERVICE the decisions, which resulted in transferring nuclear rocket research from two laboratories to just one laboratory and which "locked up" \$9,000,000 in Congressionally appropriated funds, probably has delayed the U. S. effort more than a year.

"Those decisions may have delayed us two years or more," he said, "because progress in basic research; when it comes, often snowballs. The result sometimes is a breakthrough, as in the case of the hydrogen bomb."

"I think favoritism by the aircraft industry for chemical fuels instead of nuclear power may have influenced the decision to cut back the nuclear propulsion basic research effort."

He said, during the hearing, that it was "obvious" the AEC had been forced to reduce its nuclear rocket program even before a Department of Defense committee of experts had time to make a report, and it appeared that Secretary Wilson had made up his own mind also before seeing the report.

The experts reported "the potential military value of a nuclear reactor . . . to an advanced ICBM are such as to warrant a prompt effort (by the AEC) to demonstrate the technical feasibility of such a reactor."

Sen. Anderson, who was reading from the full report, said that when Mr. Wilson sent the report on to Adm. Strauss, Mr. Wilson specifically requested that the AEC continue its work on a "moderate scale," and suggested that the committee of experts had erred in its judgment concerning proposed test dates.

The subcommittee chairman recalled that Congress had approved an additional \$9,000,000 for the AEC program, but that the Bureau of the Budget, acting on Administration economy orders, would not allow AEC to touch the money.

Science News Letter, July 26, 1958

AERONAUTICS

Reveal 2,000-Mph Planes And Rocket Test Studies

See Front Cover

► HEAVY TRANSPORT planes, as well as bombers, will be flying over intercontinental distances at 2,000 miles per hour, three times the speed of sound (Mach No. 3), in a few years as a result of research data revealed by the National Advisory Committee for Aeronautics at the triennial inspection of the Ames Aeronautical Laboratory, Moffett Field, Calif.

While the most intensive push is directed toward missiles for the conquest of space, supersonic flight for atmospheric aircraft is being so successfully explored that



SOUNDING ROCKET—This two-stage Nike-Cajon sounding rocket was fired by the National Advisory Committee for Aeronautics in a successful twilight test of the ejection and automatic inflation mechanism of a 12-foot aluminum foil satellite. The deflated satellite is carried in the aft area of the nose section of the missile. After burnout, the rockets separate in sequence.

new horizons will be reached. The first application will be to the Air Force's new chemical bomber, the North American B-70.

The world's first, full-scale five-stage rocket has been fired for test purposes off the Virginia coast over the Atlantic, exceeding Mach No. 16, or 10,516 miles per hour, and reaching an altitude of several hundred miles.

For firing models of missiles at 16,000 miles per hour, a new huge light-gas-gun, 200 feet long, is in operation at the laboratory, firing into a pressurized range 500 feet long.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the Laboratory's atmosphere entry simulator. It combines a specially shaped supersonic nozzle with a high speed gun to duplicate the flight of a missile and the atmosphere's changing density. At left is a storage tank for high pressure air. The high speed gun for model launching is not visible. Technicians are adjusting two of the 48 shadow-graph stations which make accurate picture and time records of a model flight.

When a gun-launched model flies at full re-entry speed into the simulator nozzle, it experiences in a few thousandths of a second the stress of actual re-entry.

There is also a new shock tunnel with air flowing at 12,500 degrees Fahrenheit for studying heating at hypersonic velocities. This is important in flight into space and the return to earth of vehicles from space.

Ions, which are atoms stripped of electrons, are being created in beams to determine what effects these particles, created when objects re-enter the atmosphere, will have on material from which space craft are constructed.

Ions are also being investigated as a means of propulsion in outer space, possibly in connection with atomic engines at the Lewis Flight Propulsion Laboratory, Cleveland, Ohio. NACA is developing a nuclear reactor to eject a gas at high temperature for propelling a rocket, and in another, to generate electricity to force all ionized particles rearward.

Science News Letter, July 26, 1958

TECHNOLOGY

Squeeze Tubes Feed Spacemen in Flight

► SOME 3,000 aluminum squeeze tubes are being filled with liquid and semi-liquid foods in the final test stages of a project designed to keep spacemen well-fed.

When they are filled, the tubes will be turned over to the U. S. Air Force for pilot tests at "extremely high altitudes," the American Can Company has announced.

Main advantages of the proposed method for feeding pilots dressed in space suits are that the tubes are unaffected by pressure differences inside and outside the helmet, and that the lightweight tubes—each weighs nine grams or about one-third of an ounce—can withstand the food sterilization process.

Flavored milks, fruit juices, chicken, beef and ham will be included in the pilots' test menu.

Science News Letter, July 26, 1958

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

► **Cytocultura.**—Le Institutos National de Sanitate a Bethesda in Maryland reporta que lacte discretate (reconstituite ex un commercialmente disponibile pulvere de lacte sic e cautelemente sterilisate) se ha revelate como un medio quasi ideal pro le cultivation de cellulas in vitro, specialmente in studios concernite con le effectos que varie typos de virus exerce super le cellulas. Usque nunc, le medios usate in tal studios esseva preparate con le uso de seros animal, e istos contine numerose factores que es apte a afficer le virus in multiple manieras non compatibile con un experimentation exacte. Lacte discretate non ha iste disadvantage—e illo es facile a preparar e multo incostose.

► **Recercas de Cancere.**—Le delegatos russe al Congresso International de Cancerologia a London ha reportate que in le laboratorios de lor pais experimentos cancerologic in muses comencia a esser supplementate per experimentos in lemmings de steppa. Il pare que iste animales es apte a disveloppá plure typos de cancro que es difficile o impossibile a observar in muses. Le lemmings ha etiam certe disadvantages como animales de experimentation cancerologic. Per exemplo, lor elevation es minus rapide que illo del muses.

► **Radiation.**—Es generalmente acceptate que 650 r es un dose mortal de irradiation pro le individuo human. In lor effortos a trovar methodos de defensa contra le nematodos (que representa un del plus costose pestes agricultural), scientistas del statunitense Departamento de Agricultura ha trovate que un importante specie de ille micrissime occisores de plantas tolera usque a 120.000 r per individuo. Isto significa que quanto al resistencia contra le radiation ionisante, un nematodo ha le vitalitate de 180 humanos. In certe altere species, le nematodo individual se provava capace a tolerar 640.000 r.

► **Recercas de Cancere.**—In experimentos con muses, Dr. S. Graff del Universitate Columbia ha trovate que cellulas cancerose se distingue ab cellulas normal per le facto que illos mori quando lor provision de oxigeno atmospheric es reducite al concentration que existe naturalmente a un altitude de circa 7.000 m. Iste constatacion de Dr. Graff es probabilemente sin directe importantia therapeutic. Illo representa un passo importantissime in le clarification progressive del chimismo intracellular de histo cancerose in su deviation ab illo de histo normal.

► **Agronomia.**—Dr. E. R. Sears del statunitense Departamento de Agricultura ha succedite a cruciar tritico ["froment, Weizen, wheat"] de alte cultura con le distantemente relationate herba salvage, *Aegilops umbellulata*. Le resultante planta es completamente immun a rubigine ["rouille, Rost, rust"]. Isto es importantissime, proque rubigine destrue annualmente inter 5 e 30 por cento del tritico in le Statos Unite. Infelicemente, le nove planta non possede ancora certe altere qualitates que es considerate como indispensable in tritico commercial, sed istos on spera poter re-establisher per hybridisation additional.

► **Mille-Pedes.**—Secundo Dr. H. F. Loomis de Miami in Florida—qui es un autoritate in iste dominio—le record del numero de gambas per individuo es tenite currentemente per un specie de mille-pedes statunitense que possede 190 segmentos quadrupede o un total de 760 gambas. Dr. Loomis ha recentemente descoberte un nove specie de mille-pedes al insula Barro Colorado de Panama, sed iste creatura non pote concurrer con su collega in le Statos Unite. Illo ha solmente 175 segmentos e 700 gambas.

► **Muses.**—Un racia de muses disveloppate al statunitense Instituto National pro Arthritis e Morbos Metabolic a Bethesda in Maryland se distingue per un enorme sete. Tanto le masculos como etiam le feminas bibe un quantitate de aqua per die que amonta a circa cinque vices lor pesos corporee. In le caso del masculos le resultante hydronephrosis effectua un obstruction urethral que es generalmente mortal (88%). Le plus estranie aspectu del phenomeno es que un stricte apportionamento del aqua a intra le limites del consumption normal de muses del mesme peso non pare resultar in ulle discomforto pro iste bibitores de occasion. De facto, con quotas normal de aqua, illos vive vitas de duration e felicitate normal.

► **Astronomia.**—Un ancian compendio chineze de astronomia—recentemente publicate per Dr. Hsi Tze-tsung del Academia Sinica de Peking—indica inter altere factos que le cometa Halley esseva observate in China in le anno 75 del era christian. Iste observation esseva repetite in 684 e de novo in 837. In Europa il existe nulle reporto de observationes del mesme cometa ante le anno 1305.

► **Pischeria.**—In Alaska on ha construite un nave de pesca que es propellite per un motor a reaction capace a effectuar un velocitate de 10 nodos. Le nave ha nulle helice. Isto elimina un del plus enoiantes hasardos pro le retes.

► **Mesuration del Terra.**—Le notion traditional que le radius polar del terra es circa 1/297 plus curte que le radius equatorial ha essite corrigite super le base de observationes del satellites statunitense. Secundo un reporto preliminar del servicio geodetic del arnea del Statos Unite, le valor de 1/297 debe esser reimpiacate per 1/298,38. Un nota interessantisime es que le decedite geodetic russe, Dr. N. F. Krassovsky, publicava jam in 1942 calculaciones monstrante que le correcte valor debe esser cercate in le vicinitate de 1/298,3.

► **Astrophysica.**—Le bassissime temperatura del luna rende possibile o—secundo Dr. J. R. Platt del Universitate Chicago—mesmo probabile que massas de pulvere interstellar se ha deponite a su superficie in le forma de radicales libere, i.e. de substantias que on potera designar como incomplete compositos chimic e que per consequente se distingue per un extreme instabilitate. Si isto es correcte, le choc del prime contacto con le luna—in le forma de un projectil terrestre o mesmo de un pede human—pote (sub certe condiciones) resultar in un tremende explosion. Dr. Platt opina que iste question debe esser clarificate per investigationes laboratorial.

► **Satellitologia.**—Observationes e calculaciones publicate per Drs. R. Jastrow e I. Harris del statunitense Laboratorio de Recercas Naval pare demonstrar definitiveamente que le fragmentos del rochetta del prime sputnik russe ha descendite al terra in Mongolia e non—como alcun autoritates russe asser—in Alaska.

► **Oceanographia.**—In le Pacifico Meridional, sequente le Equator sur un distantia de 5.000 km, duo naves de recerca del Instituto Oceanographic Scripps in California ha traciato un corrente subsuperficial que pare haber le fortia "de mille Mississippi." Illo esseva primo descoberte in 1952 per le decedite scientista Townsend Cromwell, e on propone baptisar lo le "Currente Cromwell."

Science News Letter, July 26, 1958

GENERAL SCIENCE

Reading Interlingua

► **YOU CAN READ Interlingua** if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

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Science News Letter, July 26, 1958

SCIENCE NEWS LETTER

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Edited by WATSON DAVIS

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PUBLIC HEALTH

Report Radiation Harm

Studies of records of patients who have been exposed clinically to radiation show a significant increase in the number of persons developing cancers.

► THE DANGER of the development of cancer several years after clinical exposure to radiation was outlined in reports presented at the International Cancer Congress in London.

Studies of the danger, however, are affected by atomic energy and fallout stimulating radiation which are known to affect the production of cancer and genetic abnormalities. The evidence presented is sometimes contradictory and, to date, inconclusive, since many latent effects of non-clinical exposure to radiation are suspected.

Therefore, one doctor pointed out, clues that indicate cancer development from clinical exposure to radiation have to come from the records of patients who had received radiation treatment many years before atomic energy and fallout.

Dr. William B. Looney, now at the University of Cambridge, England, studied the records of patients given thorotrast, thorium dioxide suspension, which was widely used in diagnostic radiology from 1930 to 1945. The records showed a high percentage of the patients developed liver neoplasm. Fifteen grams of thorium in 75 cubic centimeters of thorotrast is equivalent to 2.1 micrograms of radium.

Since skeletal sarcomas occurred in patients who had had comparable amounts of radium, the scientist looked for tumors in patients who had received thorotrast. The organs where thorium deposits would be expected to be found, the spleen, liver, bone marrow and lungs, were examined. Nine cases of liver neoplasm were found.

Only 25 of these extremely rare liver

tumors have been previously reported. Dr. Looney concluded the liver cancer was predominant for thorotrast patients as skeletal sarcoma was for radium patients. The mean latent period before cancer development was 15 years during which time the patient's liver was exposed to radiation.

Similar tumors were also produced experimentally in animals by thorium radiation.

These experiments were carried out in a joint National Naval Medical Center and University of Rochester study by Dr. Looney and Drs. J. B. Hursh, M. Colodzin and L. T. Stedman.

Two similar cases of liver cancer found 12 to 15 years later were reported by Prof. Charles M. Gros of the Anti-Cancer Center, Strasbourg, France.

One patient's liver was sufficiently radioactive to emit alpha particles 15 years after treatment.

Radiation treatment of children's thymus glands is suspected as the cause of a high incidence of thyroid cancer and other malignancies that developed later. This evidence is based upon a followup study of 2,300 children from three cities by Dr. C. Lenore Simpson of Roswell Park Memorial Institute in Buffalo, N. Y.

A mail questionnaire traced 85% with a median followup period of 14 years. Nine of those treated died of leukemia, 21 had nodular thyroids, 11 of which were cancerous, and four others had malignant tumors. There were only six malignancies among a slightly larger number of siblings, Dr. Simpson reported.

This increase among treated children is statistically significant compared with the statistics of malignancies among the siblings and the expected cancer incidence of the local population.

In addition, the thyroid tumors were not evenly distributed. Most of them occurred in the group that received the largest amount of radiation, while none occurred among children who had received less than 200 roentgens.

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ROCKETS AND MISSILES

Jupiter Nose Cones Recovered Twice

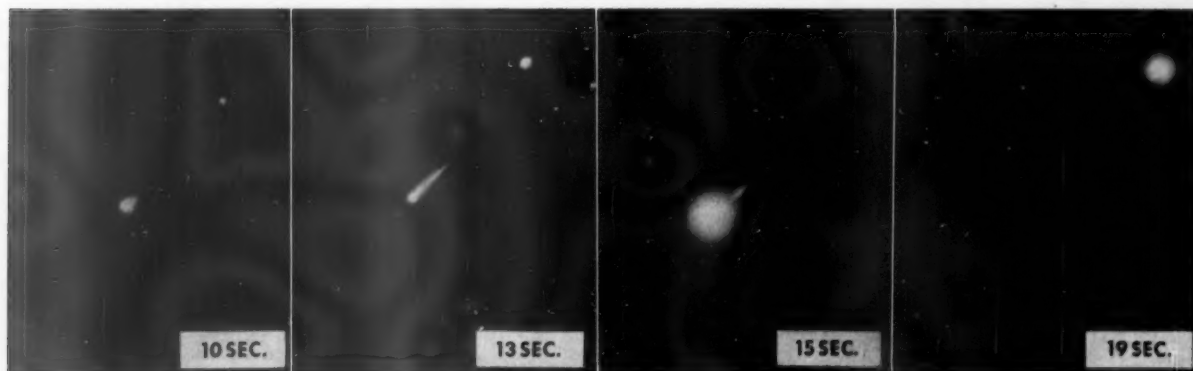
► TWO SUCCESSFUL recoveries of the full-scale Jupiter IRBM nose cone from outer space have been made. This nose cone is capable of containing a nuclear warhead and protecting it from destruction by aerodynamic heating in the atmosphere.

The first recovery was made following the firing of a Jupiter missile from the Cape Canaveral, Fla., launching site at 1:06 a.m. on May 18. Fifteen minutes later, 1,500 miles away at a point northeast of Antigua, scientists tracked the missile as it re-entered the atmosphere at a speed of 9,000 miles an hour.

On July 17 a second Jupiter missile nose cone was recovered "intact from the Atlantic," the Army Ballistic Missile Agency in Huntsville, Ala., announced.

Photographs of the first re-entry were taken by the Barnes Engineering Company, Stamford, Conn., a firm selected to perform spectral and radiometric measurements on the re-entering bodies of the missile. A meteor-type spectral camera, using a cluster of six aerial reconnaissance cameras equipped with spectral gratings was used, along with motion picture cameras. Other instruments used included a number of specially designed radiometers, held by hand. Radiation from the missile was so intense it saturated some of the instruments.

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JUPITER RE-ENTRY—Four frames from motion pictures taken of the re-entry of the Jupiter IRBM into the earth's atmosphere show the rocket body, nose cone and instrument package. At ten seconds, the rocket body (larger object) and instrument package are visible; at 13 seconds, the nose cone, (smallest object) has become visible, and the glow of rocket body has elongated; at 15 seconds, the instrument package has disintegrated, the rocket body flared up; at 19 seconds, the instrument package (out of the picture) has burned out completely, and the distance between the nose cone and rocket body has increased rapidly.

MEDICINE

Stress Cancer Prevention

The emphasis in cancer research may soon turn from the diagnosis and treatment of the disease, where there have been many advances, to ways of preventing its occurrence.

► **LIVING HABITS**, such as the foods persons eat and their smoking, have much to do with whether they get cancer and what kind of cancer, Prof. V. R. Khanolkar, the new president of the International Union Against Cancer, has reported.

The Union sponsored the International Cancer Congress that met in London, England.

Prof. Khanolkar cited the example of the Chinese who have lived in Indonesia for many generations. They have a high stomach cancer incidence, whereas the native population has a low incidence. The two groups intermingle, experience common weather and other environmental factors but maintain their own cultural traditions, including diet.

Northern Indians, as another example, Prof. Khanolkar reported, have a 14% total incidence of lip cancer while only one percent is found in Bombay residents. It is believed, he said, that the higher incidence for northern natives is caused by chewing tobacco held in the mouth. Cancer develops where the tobacco is held against the lip.

However, Prof. Khanolkar stated, oral cancer of all kinds is the commonest type of cancer in India. Stemming from an unidentified cause, the oral cancer seems to stop at the gullet's end and there is virtually no stomach cancer in India.

Moving from the diagnosis and treatment of cancer into how to prevent its occurrence was the major step forward taken by the Seventh Congress, Dr. C. P. Rhoads, director of the Sloan-Kettering Institute in New York, said.

For the first time, he said, there is general acceptance of outside causes for certain types of cancer.

This is instanced, Dr. Rhoads stated, by the virtually unanimous consensus that tobacco and tobacco smoke applied "heavily and persistently" are certain to cause cancer. If the factor involved could be determined and eliminated, the American cancer researcher said it would be a very important advance, saving hundreds of thousands of lives each year.

Present chemotherapeutic drugs alleviating symptoms and slowing the spread of cancer will be replaced by more efficient drugs as the body's chemical processes are better understood.

Dr. Rhoads said 50 agents that restrain animal cancers are now grinding through the slow mill of tests and preparation. Some may have possible clinical use within two years, he predicted, unless all prove to be false leads.

"We must change our attack if we are to achieve more lasting and regular therapeutic effects," he said. There are, he continued, "inadequate but intriguing hints that the synthesis and use of large molecules of nucleic acids will provide the specificity required to convert the cancer restraint of today to the cancer cure of tomorrow."

Nucleic acids are the chemicals that control cellular heredity and function.

The preparation of these large molecules of altered nucleic acid is going forward at the present time, Dr. Rhoads reported, and it is hoped that they will be available for clinical trials in the not too distant future.

Science News Letter, July 26, 1958

MEDICINE

International Cancer War

► **SUCCESS** in the fight against cancer and future complete control of this dread disease of mankind are based partially on tiny pieces of knowledge being gathered in laboratories throughout the world.

This was evident during the week-long sessions of the International Cancer Congress meeting in London, England.

Typical of the reports on research being conducted by scientists everywhere were the following:

1. Fowl, pigeons, hamsters, desert rats and rabbits are being trained to smoke in a manner resembling the human habit as much as possible. In some cases this is being done by holding the animal's "nose" so it has to breathe by its mouth. In one series of these tests, conducted by Dr. P. R. Peacock of the Royal Beatson Memorial Hospital, Glasgow, Scotland, no primary

bronchogenic tumors have as yet been observed in fowls. But, Dr. Peacock said, some remote tumors that are not clearly related to smoking have been observed. Respiratory tract lesions were also found in the birds after two years of smoking.

2. Cancer cells secrete a powerful, but as yet unidentified, chemical in their late growth stages. When extracted, this chemical inhibits further growth activity of many types of cancer cells in tissue culture, Dr. James F. Holland of the Roswell Park Memorial Institute, Buffalo, N. Y., reported. Dr. Holland is trying to learn the identity of this mysterious factor that was separated from mouse ascites tumor fluid.

3. The new Russian city of Angarsk is using city planning and "a new type of heating system" that completely eliminates 3,4-benzpyrene in the air. This atmos-

pheric pollutant is suspected as one possible cause of lung cancer. The city is too new to be used to obtain any comparative results with older cities, Prof. L. M. Shabad of Kamenny Ostrov, Leningrad, told the Congress.

4. "A fight a day keeps leukemia away" is the slogan applied to the work of Dr. Paul Lemonde of the University of Montreal who has demonstrated that fighting retarded leukemia and death in mice. In leukemic strains of the animals the disease appears later and less frequently in males than in females. The death age averages 305 days for the males and 267 days for the females.

Dr. Lemonde attributes his findings to the action of sexual hormones on the basis that estrogens, female hormones, promote leukemia and that castration increases it in males and decreases it in females.

When the males were separated into groups of about five per cage, those that fought and were wounded died of leukemia two months later than a group reared individually to prevent fighting. The control males' average life span was 277 days, almost equivalent to that of the females.

The fighting activity, Dr. Lemonde concludes, is a factor, therefore, in the parthenogenetic reproduction of mouse leukemia and in the difference in the incidence and survival time between the males and the females.

Science News Letter, July 26, 1958

PSYCHOLOGY

Mentally Ill Children Have Bright Mothers

► **THE MOTHERS** of mentally ill children tested were found to be unusually bright. Even though eight psychotic children being treated for schizophrenia at the Emma Pendleton Bradley Hospital, Providence, R. I., tested at an average IQ of only 84, their mothers were outstandingly bright women with IQ's averaging 122.

In addition to the eight children who averaged 84, another four could not attend to the test well enough to earn any kind of score at all.

Mothers of other emotionally disturbed children, not schizophrenic, also were found to have IQ's higher than their children, although not as strikingly so. The mothers rated at an average of 108.1 as compared to 92.7 for their children.

This comparison of the IQ of emotionally disturbed children with that of their mothers is reported in the *Journal of Consulting Psychology* (June) by Dr. Anthony Davids of Brown University and the Bradley Hospital.

The findings confirm previous clinical reports that the mothers of schizophrenic children are of high intelligence. They are often college women with experience as scientists, laboratory technicians, nurses, physicians, librarians or artists. The mothers were reported as over-intellectualized and emotionally detached, putting excessive pressure on the growing baby to achieve feats of development which are considerably beyond his age level and interests.

Science News Letter, July 26, 1958

PUBLIC HEALTH

Doctor Shortage Due

Merely maintaining the present ratio of physicians to people requires that we build about 20 new medical schools and provide them with adequate funds and staffs.

► A SHORTAGE of doctors for the American people is inevitable during the next 12 years, even if large funds for medical education and research are provided now.

Expenditures for medical research in this country can and should be tripled from the present \$300,000,000 to \$1,000,000,000 annually by 1970, a group of prominent medical educators and industry research executives told the Secretary of Health, Education and Welfare, Marion B. Folsom. He appointed the group about one year ago to advise him on long-term needs in medical research and education. Dr. Stanhope Bayne-Jones of the Army's Surgeon General's Office was chairman of the Secretary's consultants on medical research and education.

The consultants warned, however, that a medical research effort of this magnitude will require a major increase in the number of physicians and other scientists engaged in medical research, from 20,000 now to 45,000 by 1970.

More funds for more medical schools, more doctors to teach in medical schools, and more research scientists are needed for an ever expanding population that is experiencing increasing longevity.

The medical schools of today, the consul-

stants emphasized, cannot turn out enough doctors to provide sufficient staff for the research program that is needed, and still meet the growing medical care needs of the expanding population.

To maintain the present ratio of 132 physicians for each 100,000 persons in the population would involve construction of from 14 to 20 new medical schools at a cost of between \$500,000,000 and \$1,000,000,000.

Unless there is a marked change in social philosophy leading to private gifts or state appropriations on an unprecedented scale, large Federal appropriations will be required, the group said.

Among other recommendations they offered were:

1. Increases in virtually all programs of the Department of Health, Education and Welfare involving medical research.

2. Extension of research programs concerned with radiation injury, accidents, air and water pollution.

3. High priority for the purpose of securing additional funds for research, training and strengthening the staff of the Food and Drug Administration and for a suitable, well-equipped building for the FDA, including its research and training functions.

Science News Letter, July 26, 1958

SURGERY

Perform Rare Operation

► MEDICAL HISTORY has been made with the only known successful bypass heart operation of its kind.

The operation, which was performed on a seven-year-old boy, re-routed the blood around his heart. The boy's blood now bypasses the right side of his heart, traveling directly into the lungs to pick up fresh oxygen without the normal pumping push from the right heart.

As far as medical records show, this is the first time this operation has been successfully performed on a human. The surgery was performed six months ago by Dr. William W. L. Glenn, Yale School of Medicine, whose report of the operation appears in the current *New England Journal of Medicine*. This surgical procedure has been investigated by doctors in other parts of this country and abroad but results are not yet known.

The operation does not repair the damaged section of a defective heart, but simply enables part of the blood circulation to bypass the section. Dr. Glenn emphasizes that the technique is recommended only in special cases where other known means, such as "open heart" surgery, cannot be

used. Such was the case with the seven-year-old.

The success of this operation proves that at least part of the blood can be circulated through the lungs without benefit of the pumping action of the right side of the heart.

The youngster was born with a defective ventricle and defective great vessels in his heart. These defects cut down his supply of purified blood. Like other "blue" babies, he had blue coloring.

The operation consisted of taking one of the two major veins leading into the right heart and connecting this vein directly to the end of the right pulmonary artery. Normally, the blood should flow from this vein into the right heart and then be pumped to the lungs through the pulmonary artery.

Immediately following the operation, Dr. Glenn reports, there was marked improvement in the patient's coloring. Oxygenation of the blood is near normal and post-operative examinations have shown that the bypass has not forced a heavier workload on the left heart.

A few weeks after the operation when

the boy was asked how the unusual operation had helped him, he replied: "Now I can walk up the hill." Since then he has been doing even more, including running.

Science News Letter, July 26, 1958

● RADIO

Saturday, August 2, 1958, 1:30-1:45 p.m., EDT "Adventures in Science" with Watson Davis, Director of Science Service, over the CBS Radio network. Check your local CBS station.

Stanley F. Reed, President, Reed Research, Inc., Washington, D. C., will discuss "Research for the Future."

ENGINEERING

Use Cold Water To Cool Homes

► HOMES can be cooled in summer by cold water circulators for under 80 cents per day, the University of Illinois Engineering Experiment Station has reported.

Cooling systems similar to hot water radiator systems were installed in a six-room research home for under \$1,500. Water at 45 degrees Fahrenheit, pumped from a cooling unit in the garage, circulates through coils in a false ceiling. Fan-blown air circulating around the coils distributes cool air.

A bulletin on the subject written by the research team, Prof. W. S. Harris, N. B. Migdal and G. R. Sward, is available from the experiment station at Urbana-Champaign, Ill.

Science News Letter, July 26, 1958



SALIVATING FOR SCIENCE—*Margery (left) and Nancy Oliver, identical twins studying at Michigan State University, have their saliva flow collected with a special plastic device used by Dr. Harold O. Goodman, assistant professor of zoology. Dr. Goodman has been collecting the saliva of both fraternal and identical twins to determine the influence of heredity on saliva and its consequent effects on tooth decay. Preliminary results indicate there is an inherited influence.*

CHEMISTRY

Powerful, Better Magnet Opens Research Field

► SCIENTISTS soon will have a better picture of what happens to materials at extremely low temperatures near absolute zero (459.6 degrees below zero Fahrenheit), thanks to the steady and reliable field of a powerful magnet installed at the University of California at Berkeley.

The new electromagnet is much more powerful than the huge magnets in the University's cyclotrons and bevatron, although many times smaller. Although its power is exceeded by several existing magnets, it has the advantage of maintaining a very steady magnetic field over long periods, whereas the fields produced by more powerful magnets can be maintained only for a few thousandths of a second.

For California chemists who will be using the magnet, these features add up to a tool unsurpassed in the world for making precise measurements of a magnetic field's effect on properties of materials.

Information about this effect, especially at extremely low temperatures, is vitally needed for advanced work on strategic electronic devices, such as computers, missile guidance systems and radar-like detection devices.

Additionally, it will enable chemists and, particularly, plant-designing chemical engineers, to know the exact entropy or non-available energy locked up in materials. This lets them know how much energy to expect from various reactions and helps them determine when a reaction has been developed to theoretical perfection.

Science News Letter, July 26, 1958

ZOOLOGY

Skunk Odor Chemical Keeps Rattlers Away

► SOAK BITS of charcoal in "synthetic skunk juice" and scatter them around to keep rattlesnakes away.

Thio-alcohol n-butyl mercaptan frightens rattlesnakes, Dr. Raymond B. Cowles, professor of zoology at the University of California at Los Angeles, has found in laboratory experiments. This chemical has an odor almost identical to that of a skunk.

The studies suggest that bits of charcoal soaked in mercaptan solution and scattered around a campsite or a dwelling in snake-infested areas would have a strong enough odor to keep rattlers away but not enough to be unpleasant for humans.

Field tests are planned to evaluate further the "rattler repellent's effectiveness," Dr. Cowles indicated. The research is supported by the Richfield Oil Corporation.

Actual electrocardiograph recordings of rattler heart rates were taken while odors of mercaptan and king snakes (skunks and king snakes are natural enemies of the rattler) were wafted into the rattlesnakes' cage. It was found that both of these odors markedly increased the snakes' heart rates as compared with odors of food, water and other familiar items.

The king snake odor, obtained from scales on this reptile's back, increased the rattler's heart beat slightly more than the synthetic skunk odor. But the synthetic compound is a more practical repellent, Dr. Cowles said.

Interestingly enough, a definite and consistent increase in heart beat resulted from human odor, obtained by passing air through a T-shirt (relatively clean). Thus the old horse hair rope snake repellent idea might work if the rope had absorbed enough human odor. A slightly "used" T-shirt might serve equally as well as a barrier to prowling snakes in search of a warm sleeping bag, the UCLA zoologist said.

Other interesting facts noted during the experiments indicated the rattlesnake may be an important sanitary agent in nature. The studies suggested that rattlers may have a slight preference for meat that is just beginning to decay and thus eat more carrion than has been recognized.

The rattler, as a scavenger, may clean up possible sources of disease (bubonic plague, etc.) in rodent holes and other areas that other scavenger animals and birds cannot reach, Dr. Cowles pointed out.

Science News Letter, July 26, 1958

BIOLOGY

Skim Milk Proves To Be Research Tool

► SCIENTISTS have found a new and useful research tool: skim milk.

The milk has been found to be a good medium in which cell cultures can be successfully grown, Samuel Baron and Richard J. Low, division of biologics standards, National Institutes of Health, Bethesda, Md., report in *Science* (July 11).

In housewife fashion, the skim milk was prepared by dissolving instant nonfat dry milk in distilled water, according to instructions on the label.

The milk was then either boiled for five minutes or sterilized under pressure. The advantages of skim milk as a cell culture medium include its simplicity of preparation, low cost and frequency of feeding the cells, the scientists say.

In addition, the skim milk does not contain inhibitors or antibodies that fight the viruses that are placed in the cultures for study.

Animal serum has been a necessary constituent of most media for continuous cell cultures, but many of the sera exhibited the inhibitors that affect viruses.

Scientists have searched for a desirable replacement for animal serum that would sustain cells in a condition sensitive to viral effects.

Skim milk maintenance medium appears applicable as a standard medium for:

1. Comparative assay of a variety of viruses on a number of different cell cultures.
2. Safety testing of virus vaccines.
3. Isolation of viral agents which were not previously cultured, due to neutralization by serum-containing maintenance media.
4. Detection of proteolytic activity of cell cultures.

Science News Letter, July 26, 1958

IN SCIENCE

ASTRONOMY

Star Seen to Explode for Third Time in 60 Years

► ONE OF the sun's celestial neighbors, the star RS Ophiuchi in the Milky Way galaxy, was observed to have exploded on July 14 to more than 100 times its normal brilliance for the third time since 1898, the Harvard College Observatory has reported.

The star, located in the constellation Ophiuchus astride the celestial equator, normally has the visual brightness of magnitude 11.5, invisible to the naked eye. (Brightness is measured in magnitudes, the lower the magnitude, the brighter the star.) In 1898, and again in 1933, RS Ophiuchi was observed to reach a magnitude of 4.3, increasing its brightness by as much as 3.5 magnitudes per day.

In the most recent observation, made by a member of the American Association of Variable Star Observers, the star was seen to have a brightness of the sixth magnitude, or more than 100 times its normal brilliance, and clearly visible to the unaided eye.

Known as an irregular variable showing only slight normal variations, the star may not necessarily be on its way "up" to maximum brilliance at the present time. Astronomers emphasize it may well be on its way back "down" to relative obscurity, since an exploding star is known to remain at maximum brilliance for only a very brief period. Maximum may have occurred during our daytime when the star was invisible.

Science News Letter, July 26, 1958

PSYCHIATRY

Activity of Fat Women Affected by Emotion

► THE PHYSICAL activity of fat people is little affected by eating more but is principally affected by changes of mood such as the depression to which they are particularly vulnerable.

This was revealed by a study of the daily walking of obese women undergoing long-term mental treatment. The study was reported to the American Psychiatric Association by Dr. Albert J. Stunkard of the University of Pennsylvania, Philadelphia.

Physical activity is, of course, decreased by physical illness and injury, he said. Most persons showed characteristic cycles of activity over week ends. Change in occupation and acquisition or loss of an automobile resulted in changes in physical activity. But the greatest influence affecting activity was change in mood.

Fat women were found to walk only half as far as women of normal weight and their energy expenditure was significantly lower.

Science News Letter, July 26, 1958

ICE FIELDS

MEDICINE

Japanese Perfect Blood Test for Cancer Detection

► A SIMPLE blood test that detects cancer growth in the human body has been reported by three Japanese scientists.

The test produces a red spot easily identified by the paper-chromatography method if there are malignant cells traveling within the blood stream. The exact substance that the scientists can tag as an indication of malignancy is their own discovery, malignolipin, a phospholipid, that could never be found in normal tissue. Takekazu Kosaki, Shinya Nakagawa and Toshiko Saka of the department of biochemistry at the Mie Prefectural University School of Medicine, Tsu, have reported their work in the *Proceedings of the Japan Academy* (May).

The detection of malignolipin in blood by this method was negative with the blood of 18 normal persons and eight patients not bearing malignant tumors, but suffering nephritis, aplastic anemia, leukemia, duodenal ulcer, prostate hypertrophy, eczema and axillary odor. The test was positive, however, without exception, in 25 patients bearing cancer of the lung, stomach, rectum, maxilla, uterus, mammary gland, urinary bladder and prostate.

In addition, after the removal of a tumor, the test responds negatively unless removal is incomplete.

Tests of the effect of malignolipin on ascites tumor growths in mice indicate that the substance accelerates and promotes cancer cell growths.

Malignolipin is believed by the investigators to be the first natural substance acting as a promoter of malignant tumors, isolated from human malignant tumors and identified in its properties.

Malignolipin has not been detectable in the normal tissue of liver, kidneys, alimentary tract, lungs, heart, pancreas, spleen, urinary bladder and prostate.

Science News Letter, July 26, 1958

PSYCHIATRY

Psychiatric Treatments Aid Retarded Child

► PSYCHIATRIC treatment of mentally retarded children and their parents can help the child to function more normally and might reduce considerably the population of institutions for the mentally defective.

But the attempt to do something for the child should not be put off until the child is of school age, warn a group of psychiatrists, Dr. Katharine F. Woodward, Dr. Miriam G. Siegel and Marjorie J. Estis of Lenox Hill Hospital, New York.

The scientists describe in the *American Journal of Orthopsychiatry* (April) a study

of nine mentally retarded children. All the parents of these children were of at least average intelligence. Three of the fathers were professional men and the others were white collar workers. But without exception, all the parents showed personality problems. Treatment of the parents proved to be of major significance in the study and treatment of the children.

Mental disturbance underlies the mental retardation in the children to a sufficient extent so that it can be considered as instigating the slow-down of mental development, it was found. After two years of psychiatric treatment of themselves and their parents, all but one of the children showed improvement. Those children in whom psychotic features were less marked showed more improvement.

Mental retardation is not a diagnostic entity in itself, the scientists conclude, but a symptom for which a cause must be found.

Science News Letter, July 26, 1958

SURGERY

Technique Evaluates Heart Valve Surgery

► A TECHNIQUE that allows a more accurate evaluation of heart-valve surgery during such operations has been reported by a team of surgeons and cardiologists at the National Heart Institute, Bethesda, Md.

With this technique, direct measurements are made of the heart's output of blood and of differences in pressure on each side of abnormally narrowed, or "stenosed," valve openings just before and after these openings are surgically enlarged.

Previously, evaluation of such surgery was accomplished by measuring pressures and output of blood before and after, but not during the operation.

Surgeons can now determine what percentage of the valve's function has been restored and whether to enlarge the valve opening still further during the same operation, Drs. Herbert Tanenbaum, Eugene Braunwald and Andrew Morrow of the Heart Institute Clinic of Surgery said.

The method is applicable in operations for stenosis of any of the four valves of the heart. Its value was demonstrated in studies of 24 patients undergoing valve surgery at the Heart Institute.

The technique consists of:

1. Measuring, simultaneously, pressures in the chambers immediately upstream and downstream from the diseased valve by puncturing these chambers with hypodermic needles. (Pressure changes, transmitted up the needles, are converted into electrical pulses that are projected as two parallel tracings across an oscilloscope screen.)

2. The effect of the surgery in relieving the abnormal pressure difference is apparent when these measurements are repeated immediately after the surgeon opens the heart and inserts his finger, or an instrument, into the valve opening to enlarge it.

3. Measuring the output of blood just before and after this operation is accomplished by tracing the concentration of a special dye and its transit time through the circulation.

Science News Letter, July 26, 1958

CHEMISTRY

Sunlight's Role in Smog Investigated

► THE BATTLE against Los Angeles' smog has turned to a close scrutiny of natural sunlight and its role in the air pollution cycle.

Use of sunlight is part of the effort by the Air Pollution Test Facility Project at the University of California at Los Angeles to simulate, for controlled experiments, the atmosphere over a modern city.

To make the simulation as realistic as possible, the project leaders, Harry Buchberg, associate professor of engineering, and Dr. Katherine W. Wilson, associate chemist, decided to take the project out of the laboratory and construct it outdoors, on the roof of the UCLA Engineering Building.

The dominating feature of the system is the air reaction chamber, a huge inflated plastic tube, in which clean air is mixed with doses of pollutants. It resembles a tremendous elongated doughnut, the tube being some 190 feet long and 20 feet in circumference.

The project demands teamwork among the engineer, the chemist, and the psychologist. In current experiments, Wilbur C. Middleton, associate research psychologist, is measuring degrees of eye irritation on a group of volunteer UCLA psychology students exposed to simulated smog.

"The ultimate goal of our project," says Prof. Buchberg, "is preventive action. As new industries, processes and fuels are developed, we want to be ready in advance to determine the control measures that will prevent the creation of an air pollution problem."

Science News Letter, July 26, 1958

GENERAL SCIENCE

Russians Invite Top Scientists to Moscow

► RUSSIA's increasing emphasis on science and her challenge to become the world's number one scientific nation were evidenced by Soviet invitations this year to hold two important international gatherings in Moscow.

The Soviet Union has made a bid for the Eighth International Cancer Congress in 1962 and the Ninth International Conference on High Energy Physics in 1959. Both groups have just recently met in London and Geneva, respectively. (See SNL, July 19.)

Each of the international gatherings brings together the highest authorities in their fields to exchange their most recent research results formally and informally.

Dr. Harold Dorn of the National Institutes of Health, Bethesda, Md., reported that the head of the Soviet delegation to the Seventh International Cancer Congress, Prof. Nicolai Blokhin of the Academy of Medical Science, said that his country "was prepared to issue visas for delegates from all countries of the world."

This offer was made even though the next Congress is still four years away.

Science News Letter, July 26, 1958

ASTRONOMY

Mars Appears Late

The red planet Mars, steadily approaching nearer to the earth, will be the brightest object in the sky when it appears late in August evenings.

By JAMES STOKLEY

► THE RED PLANET Mars, shining more brilliantly than any other planet or any star visible at the same time, will appear in the eastern sky late in August evenings. This is the first time this year it can be seen before midnight.

Since last September, when it was farthest away, out on the opposite side of the sun, Mars has been drawing closer to the earth. From a distance of 84,500,000 miles on Aug. 1, it comes to within 64,000,000 miles on the 31st. During the autumn the approach will continue and it will be nearest Nov. 8, only a little more than 45,000,000 miles away, nearer than it will be for the next 15 years.

Although the accompanying maps show the appearance of the evening skies in August, Mars is not shown. This is because they are prepared for about ten o'clock, your own kind of standard time (add one hour for daylight saving), at the first of August, an hour earlier at the 15th and two hours earlier at the end of the month. Mars rises after these hours.

Even more brilliant than Mars is Jupiter, which sets, at the beginning of the month, about two hours after sunset. It, too, fails to get on our maps. However, it is in the constellation of Virgo, the virgin, the eastern part of which is shown low in the southwest, to the right of Scorpius, the scorpion. Jupiter is a little to the east of Spica, the brightest star in Virgo.

One planet is shown on the maps. This is Saturn, fainter than either Mars or Jupiter, but equal to a first-magnitude star. It is in Ophiuchus, the serpent-bearer, seen in the southwestern sky. Just below is the constellation of Scorpius with the red star Antares.

Vega: Most Brilliant Star

The most brilliant star of the August evening is Vega, in Lyra, the lyre, which stands directly overhead at the times for which the maps are drawn. Nearby, toward the south, is Aquila, the eagle, with Altair. Toward the east is Cygnus, the swan, in which Deneb is to be found.

Another bright star, second only to Vega, is in the west. This is Arcturus, in Bootes, the bear-driver, a reference to its proximity to Ursa Major, the great bear, of which the "big dipper" is a part. This figure is seen to the northwest. In the lower part are the two "pointers," whose direction leads to Polaris, the pole star, which is part of the little dipper, in Ursa Minor, the little bear.

The stars mentioned, except Polaris, are all of the first magnitude, but some fainter ones are also seen, which form characteristic groups, easily identified.

In the south, just to the left of Saturn, for example, is Sagittarius, the archer. The stars here form the outline of a teapot, with the handle to the left and the spout to the right, just above the hook-shaped group of stars that make the tail of the scorpion. In the east is the "great square," mainly part of Pegasus, the winged horse; the square resting on one corner.

The star in the left corner is Alpheratz, which is in Andromeda, the fettered princess. And to the left we see her mother, the queen, Cassiopeia. These stars form a letter W, standing on one side, the top of the letter to the left.

Starry Metropolis

When we look toward the teapot-shaped constellation of Sagittarius in the south, we are looking "downtown" in the metropolis of stars of which we are a small and rather insignificant part. For the stars, many of which, like the sun, may well be accompanied by a family of planets, are arranged something like houses and other buildings. Here is a great city. At the center these structures are packed very closely together; farther out they are more scattered. Then comes an interurban area where you find only an occasional house, until you approach

another city. At the heart of this the buildings again are closely packed.

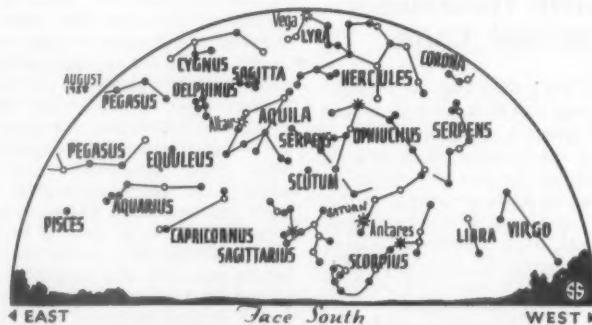
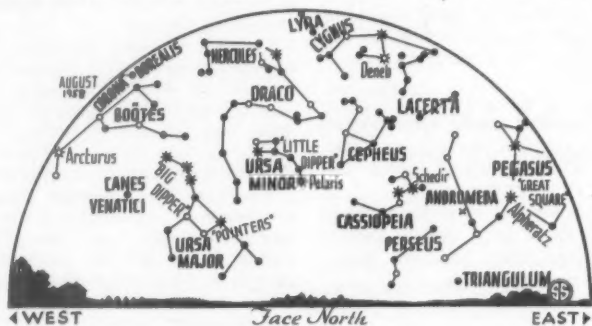
Our stellar city is the Milky Way galaxy, shaped something like two soup plates stuck together facing each other. In it are about a hundred billion stars. The diameter of the galaxy is about 600 quadrillion miles. Expressed in the astronomer's unit, this is about 100,000 light years. (A light year is about six trillion miles—the distance a beam of light will travel in a year.) At the center the thickness is about 10,000 light years.

Earth Is "Up-town"

The earth is located about two-thirds of the way out from the center to the edge and at this distance the thickness of the galaxy is perhaps 2,500 light years. The center is in the direction of Sagittarius, so when we look that way, we are looking "downtown."

The whole galaxy is rotating, although not like a wheel. Rather is it similar to the motion of the planets in the solar system, with those innermost going fastest. At the sun's distance from the center, it makes one complete revolution in some 200,000,000 years, a period sometimes called the "cosmic year."

It is because of the shape of the galaxy that we see the Milky Way, which is the concentration of stars as we look out toward the edge, in the galactic plane. Toward the sides, the stars are much more sparse. At this time of year we can see the Milky Way



☆ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

extending from Cassiopeia in the north, through Cygnus nearly overhead, down to Sagittarius in the south. It is hard to see from a city, in competition with city lights, but with a dark sky, out in the country, it is readily apparent. Even a pair of binoculars will show that it consists of a swarm of individual stars and they are most numerous in the direction of Sagittarius, where the Milky Way looks brightest. This, of course, is the direction of the galactic center, which is about 30,000 light years away.

Millions of Galaxies

Just as there are other cities, beyond the limits of your own, at various distances, so are there other galaxies, millions of them, in fact, scattered throughout the universe. One of the closest is just visible to the naked eye, on a dark night, in Andromeda. Its position is shown by a small "x" on the map.

Its distance is about 1,500,000 light years, so it is by far the most distant object that one can see with the naked eye.

In size the Andromeda galaxy equals ours. It may even be somewhat bigger. This represents a reversal of opinion among astronomers in recent years for they used to think it considerably smaller than ours. Then they found that the dimensions of our own had been overestimated, which partly removed the discrepancy.

Next they revised the distance scale for the other galaxies, and the one in Andromeda turned out to be about twice as far as they had supposed. Therefore, to look the size that it does in the sky, it had to be twice as large.

Life in Space?

As we reach out farther and farther into space, with bigger and bigger telescopes, more and more galaxies come into view. Some, like the one in Andromeda, have a spiral structure, like a huge pinwheel. Others are shaped like a flat lens, and show few details of structure. A third class shows an irregular shape, with no particular form. These are the components of our universe: millions and millions of galaxies, each containing millions or even billions of stars.

A good proportion of these stars are probably accompanied by planets like those around the sun. Many of these planets may well be inhabited. It no longer seems that our earthly life is unique—or nearly so.

Celestial Time Table for August

August EST

5	1:00 p.m.	Moon farthest; distance 251,300 miles.
7	4:45 a.m.	Moon passes Mars.
	12:49 p.m.	Moon in last quarter.
12	early a.m.	Meteors visible; emanating from constellation of Perseus.
13	6:02 a.m.	Moon passes Venus.
14	10:33 p.m.	New moon.
17	10:00 a.m.	Moon nearest; distance 226,200 miles.
19	10:06 a.m.	Moon passes Jupiter.
21	2:45 p.m.	Moon in first quarter.
23	2:47 a.m.	Moon passes Saturn.
29	12:53 a.m.	Full moon.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, July 26, 1958

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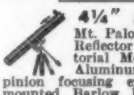
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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service; 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIRPLANE DESIGN MANUAL—Frederick K. Teichmann—Pitman, 4th ed., 489 p., illus., \$8.50. Revised college text for engineers.

CLIMATOLOGY: Reviews of Research—E. L. Deacon and others—UNESCO (Columbia Univ. Press), 190 p., illus., \$5.25. Reports of a symposium on arid zone climatology, with special reference to microclimatology. Bibliographies.

CURRENT RESEARCH AND DEVELOPMENT IN SCIENTIFIC DOCUMENTATION, No. 2—Madeline M. Berry, compiler—National Science Foundation, 54 p., paper, free upon request direct to publisher, Washington 25, D. C. Lists all pertinent activities in the United States and a few foreign projects.

CURRENT TRENDS IN HETEROCYCLIC CHEMISTRY—Adrian Albert, G. M. Badger and C. W. Shoppee, Eds.—Academic, 170 p., figures, \$5.50. Proceedings of a symposium—held at Canberra, Australia. Heterocyclic substances perform important functions in the living cell, as vitamins, co-enzymes, and components of nucleic acid.

DIFFERENTIAL EQUATIONS—Forest Ray Moulton—Dover, 395 p., paper, \$2. Unabridged republication of 1930 edition.

DISTRICT OF COLUMBIA BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS, 1958 Roster—Robert F. Cogswell, Dir.—Dept. of Occupations and Professions, 94 p., paper, free upon request direct to publisher, 1740 Mass. Ave., N.W., Washington 6, D. C.

EDIBLE WILD PLANTS OF EASTERN NORTH AMERICA—Merritt Lyndon Fernald and Alfred Charles Kinsey, rev. by Reed C. Rollins—Harper, rev. ed., 452 p., illus., \$6. Illustrated guide. Discusses edible flowering plants and ferns, excludes mushrooms.

THE EFFECT OF FERROUS SULFATE CONCENTRATION ON THE GROWTH OF PLANTS—J. H. ...

MAN AND NUMBER

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TRATION ON THE YIELD OF OXIDATION OF FERROUS ION BY RADIATION OF HIGH LET—Robert H. Schuler—Mellon Institute, 4 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

EXPERIMENTAL CHEMISTRY—Michell J. Sienko and Robert A. Plane—McGraw-Hill, 213 p., illus., paper, \$3.25. Laboratory manual for college students, stresses the distinction between observation and interpretation.

A FLORA OF SAN FRANCISCO, CALIFORNIA—John Thomas Howell, Peter H. Raven and Peter Rubtsov—Univ. of San Francisco, 157 p., illus., paper, \$3. Reprint of the spring 1958 issue of the *Wasmann Journal of Biology*.

FRONTIERS IN CYTOLOGY—Sanford L. Palay, Ed.—Yale Univ. Press, 529 p., 253 plates, \$9.75. Group of lectures given in memory of the late Dr. Henry Bunting. Bibliographies included.

GARDEN POOLS, WATER-LILIES, AND GOLDFISH—G. L. Thomas, Jr.—Van Nostrand, 222 p., illus., \$5.95. Tells all about water gardens, claimed to be the easiest gardens to maintain.

GENERAL CYTOCHEMICAL METHODS, Vol. 1—J. F. Danielli, Ed.—Academic, 471 p., illus., \$12.80. Survey of methods available in cytochemistry, a field with remarkable possibilities of understanding the chemical structure of cells.

GENETICS: A Survey of the Principles of Heredity—A. M. Winchester—Houghton, 2nd ed., 414 p., illus., \$6.25. College text brought up to date.

A GUIDE FOR EVALUATING YOUR SCIENCE FACILITIES: Can They Fulfill Today's Requirements?—Paul DeH. Hurd—Scientific Apparatus Makers Assn. with School Facilities Council, 16 p., illus., paper, free upon request direct to publisher, 20 N. Wacker Drive, Chicago 6, Ill. To help you size up what you have in your own local high school.

HISTORY OF MATHEMATICS, Vol. I: General Survey of the History of Elementary Mathematics; Vol. II: Special Topics of Elementary Mathematics—David Eugene Smith—Dover, 596 and 725 p., illus., paper, 2 volume set boxed \$5, \$2.75 each volume. Unabridged republication of 1951 2nd ed. of this textbook on the history of elementary mathematics.

INSPECTION FOR DISARMAMENT—Seymour Melman, Ed.—Columbia Univ. Press, 291 p., illus., \$6. Study defines the necessary conditions for a workable inspection system needed to ensure compliance with a disarmament agreement. Bibliographies.

INTRODUCTION TO NUCLEAR ENGINEERING—Richard Stephenson—McGraw-Hill, 2nd ed., 491 p., illus., \$9.50. Revision includes material made available by the broad declassification program of 1957.

MARBLE—Oliver Bowles—Bureau of Mines, Information Circular 7829, 31 p., illus., paper, single copies free upon request direct to publisher, 4800 Forbes St., Pittsburgh 13, Pa.

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MATHEMATICAL TABLES OF ELEMENTARY AND SOME HIGHER MATHEMATICAL FUNCTIONS—Herbert Bristol Dwight—Dover, 2nd ed., 220 p., paper, \$1.75. Revised 1941 edition.

MICROWAVE TRANSMISSION DESIGN DATA—Theodore Moreno—Dover, new ed., 248 p., illus., paper, \$1.50. First published by Sperry Gyroscope Company in 1948.

MINERALS YEARBOOK 1955, Vol. 1: Metals and Minerals (Except Fuels)—Bureau of Mines, Div. of Minerals staff—Govt. Printing Office, 1357 p., \$4.25. Record of performance of the Nation's mineral industries during the year, with enough background information to interpret the year's developments.

MORPHOGENESIS: The Analysis of Molluscan Development—Chr. P. Raven—Pergamon, 311 p., illus., \$10. Survey of the present state of knowledge on development in the molluscs, both descriptive and experimental.

OTHER WORLDS IN SPACE—Terry Maloney—Sterling, 128 p., illus. by the author, \$2.95. Explains the fundamentals of modern astronomy with special emphasis on the planets. For the science-minded student. Glossary.

PROBLEMS OF ECONOMICS, Vol. 1, No. 1—Myron E. Sharpe, Ed.—International Arts and Science Press, 79 p., paper, \$3, annual subscription (12 issues) \$35. English translation of the U.S.S.R. Monthly Journal *Voprosy Ekonomiki*.

THE RESEARCH ATTACK AGAINST CEREBRAL PALSY—foreword by Pearce Bailey—National Institute of Neurological Diseases and Blindness, 20 p., illus., paper, single copies free upon request direct to publisher, National Institutes of Health, Bethesda 14, Md.

A REVIEW OF THE MIDDLE AND UPPER EOCENE PRIMATES OF NORTH AMERICA—C. Lewis Gazin—Smithsonian, 127 p., illus., paper, \$1.75. Examines the abundant and diverse fossil remains of this early period.

SCIENCE AND BUSINESS—Vannevar Bush—Merck & Co., 12 p., paper, free upon request direct to publisher, Rahway, N. J. On the role of research in industry today.

THE SCIENCE OF HIGH EXPLOSIVES—Melvin A. Cook—Reinhold, 440 p., illus., \$22.50. Monograph describing detonation processes and related phenomena with theoretical interpretations.

A SELECTED BIBLIOGRAPHY OF RESEARCH AND DEVELOPMENT AND ITS IMPACT ON THE ECONOMY—Office of Special Studies—National Science Foundation, 21 p., paper, free upon request direct to publisher, Washington 25, D. C.

SIGNS, SYMPTOMS AND TREATMENT OF CERTAIN ACUTE INTOXICATIONS—William B. Deichmann and Horace W. Gerarde—Thomas, C. C., 2nd ed., 154 p., \$3.75. Condensed synopsis on poisons, many new insecticides and industrial poisons added.

SPACE FLIGHT: Satellites, Spaceships, Space Stations, and Space Travel Explained—Carsbie C. Adams and others, foreword by Werner von Braun—McGraw-Hill, 373 p., illus., \$6.50. For the general reader a thorough review of the history and the astronomical and engineering fundamentals of astronautics, with a broad outlook into the future. Each chapter followed by ample bibliography.

TAPE EDITING AND SPLICING: For the Professional and Amateur Tape Recordist—N. M. Haynes—Robins Industries Corp., 24 p., illus., paper, 25¢. How to get more use from your tape recorder.

A WONDERFUL WORLD FOR CHILDREN—Peter Cardozo—Bantam Books, 2nd ed., 246 p., illus., paper, 35¢. For parents, children and teachers, lists thousands of free booklets and things to entertain and instruct children.

PUBLIC HEALTH

Dentists Denounce Many Toothpaste Ad Claims

► DENTISTS are putting the squeeze on the toothpaste manufacturer for his unsupervised advertising claims.

"Misleading" and "detrimental to the public's dental health" were the labels used by members of the American Dental Association to describe the claims used by leading toothpaste manufacturers.

Such advertising claims affect important health factors as a false sense of security about dental decay, gum diseases, "bad breath" due to diseases of the nose, sinuses, lungs and the gastrointestinal tract, and serious systemic diseases presenting a variety of oral symptoms.

Dr. Harry Lyons, dean of the School of Dentistry of the Medical College of Virginia, was particularly critical of ads that claim that once-a-day brushing with a particular toothpaste could substitute for oral hygiene measures long recommended by dentists.

"Some of the advertising goes so far as to imply that 'sweets' may be eaten with impunity through the day, provided only that the toothpaste in question has been used just once in the morning before breakfast," Dr. Lyons said.

This vicious suggestion, as Dr. Lyons termed it, "flies in the face of all that has been done by the health professions to educate the public about hygienic and dietary measures for protecting the teeth against the ravages of decay."

The Federal Trade Commission has admitted that it is powerless to halt unsupervised advertising claims for dentrifices.

The A.D.A. believes strongly that existing law and enforcement procedures need strengthening at least insofar as therapeutic claims for dentrifices and drug products are concerned, another association member, Dr. Ralph E. Creig, of Cleveland, told a House of Representatives Subcommittee on Legal and Monetary Affairs. The Subcommittee is investigating a request by A.D.A. representatives that legislation be passed to permit Federal agencies to control "reckless claims of advertising."

No dentrifice available today has been demonstrated to be of significant value in preventing oral disease, Dr. Sholom Pearlman of Chicago, assistant secretary of the Council on Dental Therapeutics of the A.D.A., said.

Science News Letter, July 26, 1958

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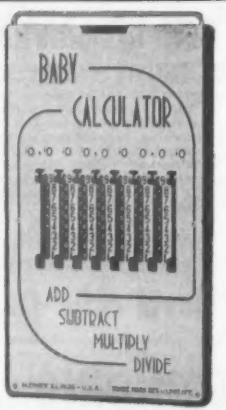
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Questions

AERONAUTICS—How fast did the first full-scale five-stage rocket, fired for test purposes, travel? p. 51.

MEDICINE—What differences were found in types of cancer in residents of northern India and of the Bombay area? p. 54.

ZOOLOGY—What is the name of a chemical that has been found to repel rattlesnakes? p. 56.

Photographs: Cover and p. 51, National Advisory Committee for Aeronautics; p. 53, Barnes Engineering Company; p. 55, Michigan State University; p. 64, Eastman Chemical Products, Inc.

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MEDICINE

Find Cancer Defenses

► THE ARGUMENTS supporting the belief there are natural defenses against cancer within the body were presented in a progress report issued by the Sloan-Kettering Institute for Cancer Research, New York.

The existence in the healthy person of natural defense mechanisms against cancer is evidenced by a series of investigations conducted in cooperation with the Ohio State Penitentiary. These studies have shown well persons can reject implants of human cancer tissue, while patients with far advanced cancer cannot. Second implants of cancer cells are rejected by the well volunteers even more rapidly than the first implants.

This shows there are two types of natural defense: 1. A defense that is innate in the well person; 2. A defense like that against an infectious disease, one that is stimulated by exposure to the disease-causing cells.

The first defense seems to be related to the presence in the blood of an agent known as properdin, the report stated.

The innate volunteers had it in normal amounts and the cancer patients either lacked it completely or had abnormally low amounts of it.

To study the second type of defense, Sloan-Kettering investigators are now injecting cancer cell fractions into the Ohio volunteers to determine which fraction contains the defense-evoking material.

Animal studies by another group of investigators have shown that natural defenses against cancer can be stimulated artificially.

This was accomplished by injecting cancerous mice with a material known as zymosan. The cancers gradually dissolved and disappeared. Experiments have shown that zymosan does not inhibit the cancer directly, but apparently helps the body defend itself against such cancer growth. Other workers have shown that zymosan injections increase the level of properdin in mice. The possibility that this may be

the way in which zymosan inhibits cancer growth is now under study.

Sloan-Kettering scientists have also developed a vaccine that prevents one type of experimental cancer in mice.

Studies are also underway in the following fields: The growth in chickens of human cancers; fractionation of human cancer cells to discover the source of cancer-destroying poisons; tracing of fluorescent antibodies in animals with virus-caused cancers.

Science News Letter, July 26, 1958

OBSTETRICS

Expectant Dads Should Eat Special Diet Too

► THE EXPECTANT father should eat a special diet, too, during his wife's prenatal period.

In fact, they both should share the same prenatal diet, Dr. Genevieve Stearns of the College of Medicine, State University of Iowa, reports in *Children* (July-August), published by the U. S. Department of Health, Education and Welfare.

Usually, when the young pregnant woman is given dietary advice, she comments that she cannot follow the diet because it would involve cooking two separate meals. The husband requires a separate diet because he does not ordinarily eat the foods prescribed for his wife's pregnancy.

A potent argument for the young father-to-be is to remind him that the coming baby is his also, Dr. Stearns advises. It is his wife's duty to eat what she needs to bear a sturdy infant. It is his duty to see that she does.

Taking this responsibility will not injure him in any way, and it may even help the next baby. If an expectant father is asked to become guardian of his wife's diet, he usually assumes the responsibility, although it forces him to taste and to eat many foods he has never tried to eat before.

Science News Letter, July 26, 1958

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Fits in Pocket or Purse—PALM SIZED—WEIGHS 3 OZS.

HOW THIS AMAZING TRANSISTOR POCKET RADIO WORKS—THE SECRET IS AIR!

At this point, you're probably wondering "how in the World can a portable radio possibly work . . . and how can it possibly cost so little?" The answer is simple: While working on a military problem, scientists developed a new type of self-powered radio signal detection device called a GERMANIUM DIODE, the same miracle invention now being used on radar and sonar equipment. This new invention actually generates its own power by drawing electric waves RIGHT OUT OF THE AIR just like a magnet, and converts those waves to audible sound signals! And it is this amazing electronic discovery that finally makes it possible for you as a civilian to own a practically lifetime pocket radio . . . scientists have actually condensed an entire radio power plant into a 3 oz. unit the size of a pack of cigarettes and lasts indefinitely. Because, incredible as it may seem . . . each time you use it, it draws in more radio signals from the air . . . it then digests a new "electrical meal" and stays just as powerful as when it was brand new! But wait . . . that's not all.

EXTRA TRANSISTOR AMPLIFIER PLUS BUILT-IN FERRITE LOOPSTICK ANTENNA . . . 3 EXTRA FEATURES!

To make sure that your PARADE TRANSISTOR PORTABLE doesn't merely "just play", but gives you the finest reception possible . . . electronic engineers have added 3 bonus features . . . features you'd ordinarily expect to find only on extremely expensive hi-fi sets! First, there's the super-distance Ferrite Loop antenna plus auxiliary external antennae and ground attachments that gives your PARADE TRANSISTOR PORTABLE out of town reception. Second—for extra clarity and volume, a transistor amplifier is used. Third, is the direct



circuit personal earphone speaker that enables you to listen to your favorite program in complete privacy. Even in bed, without disturbing others. This feature alone will give you more hours of use and pleasure than you ever enjoyed from a radio before. And remember . . . it's yours without a single penny's extra cost. In other words, when you receive your PARADE TRANSISTOR RADIO, you are not getting a toy or some flimsy gadget, but a true, precision engineered portable radio that is designed for years of trouble free service. It must last and last. You can now operate your PARADE TRANSISTOR RADIO 20 hours a day at a battery cost of less than 1c . . . or it costs you nothing! We guarantee your PARADE TRANSISTOR RADIO will play with brand new clarity and power years from now. Never before has there been a guarantee as strong as this!



WEIGHS SO LITTLE YOU DON'T EVEN REALIZE YOU'RE CARRYING IT!

Just think! Here at last is a transistor portable that is so light and takes up so little space that you can actually tuck it into the pocket of a man's shirt like a pack of cigarettes! Or in a woman's purse, just like a compact.

Now at last, a fine precision-made radio that you can slip into your pocket and take to work . . . in factories . . . in ball parks . . . on fishing and camping trips . . . on vacations or picnics . . . a transistor pocket portable that you'll carry with you and can enjoy day in and day out all your favorite radio programs anytime. Now you can listen to the news, sports, music or weather by simply reaching into your pocket and tuning into the local station.

RUSH FOR PORTABLES WILL SOON EXHAUST OUR SUPPLY!

This FREE-TRIAL offer May End Any Day . . . SO ACT NOW! Now the price of your PARADE TRANSISTOR RADIO on this special offer is an unbelievably low \$7.95 . . . probably the lowest price a portable has ever been sold for in this country. With the PARADE TRANSISTOR PORTABLE there are no tubes to buy. It not only pays for itself, but in the long run saves you money too. However, at this low price, the expected RUSH of orders will dwindle our supplies rapidly, and since production cannot possibly keep up with the demand, once the season gets fully under way . . . this offer may not be repeated this

year. Therefore, all orders will be filled on a first come, first served basis. Once our limited supply is exhausted, we will be forced to withdraw this offer. Send the no-risk coupon today.

THINK OF IT!

Not only the smallest transistor portable in the world, but the lowest PRICED ONE TOO! THE PRICE . . . ONLY \$7.95. One of the most incredible inventions of our century . . . One that will leave your friends and neighbors completely startled the moment they see it . . . the moment they hear it! For the first time ever, a POCKET SIZED TRANSISTOR PORTABLE, FOR ONLY \$7.95. The secret is a built-in lifetime power plant, the same type now being used by the Army and Navy in their radar and sonar equipment.

LOUD CLEAR RECEPTION

IN FRINGE AREAS

Here for the first time ever is a transistor pocket size radio—that pulls in programs loud, sharp and clear. A miracle of electronic science that gives you excellent audibility in fringe areas. Yes, a completely new kind of radio . . . You simply turn it on, it starts to play INSTANTLY! It's like carrying your favorite entertainment with you on picnics, boat rides, on the beach, at camp, ANYWHERE! It will pull in broadcasts from miles away clear and sharp. Yet, with all of this super-power reception, here for the first time ever is a pocket-size portable that is as small and compact as a pack of cigarettes and just as light.

TRY IT FOR 10 DAYS!

Naturally, the best proof of just how sensational this PARADE TRANSISTOR RADIO really is, is in your own home. That's why we invite you to try it for 10 days . . . And, if after hearing its tone and clarity . . . if after using the personal earphone . . . if after taking it and using it wherever you go, you don't agree this is truly a once-in-a-lifetime opportunity to own this PARADE TRANSISTOR PORTABLE that's unlike any portable ever made and sold in this country before, then simply return it and it has not cost you a cent.

MAIL COUPON TODAY

GENERAL TRADING CO.

31 Second Ave. Dept. HP-2617

New York 3, N. Y.

Send me my PARADE TRANSISTOR RADIO (complete with personal earphones and batteries and built-in super distance antenna) right away with this understanding: If I don't agree that this is by far the greatest value offered in a portable radio . . . then you will refund my money immediately.

CHECK OFFER DESIRED SAVE MORE

☐ I enclose \$7.95 on money back guarantee. Postage Prepaid ☐ I enclose \$14.95 (One for myself and one for a friend) and I save \$1.00.

☐ Check ☐ Cash ☐ Money Order

Name

Address

City State

() Send C.O.D. I enclose \$1.00 deposit and will pay postman balance plus postal charges.

FACTS!

- Measures only 3 1/4 x 2 1/4 x 1 1/2"
- Comes complete with Batteries.
- plays without batteries in an emergency.
- 2 Penlite Batteries (replacement cost 20¢) will last for 400 hours of Musical Delight.
- Silver plated non-corrosive contact points.
- On and off switch.
- No electric plug-in.
- Printed circuit.
- Gold Mylar Grills.
- Picks up Conehead.
- Fits in the palm of your hand.
- Large selection of stations.
- 90 day Manufacturer's warranty.
- Built-in transistor amplification circuit.
- HI-IMPACT unbreakable plastic case.
- Lowest cost transistor radio ever sold.
- THIS IS NOT A CHEAP IMPORTED CRYSTAL SET.
- Made in U. S. A.

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 945. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **EMERGENCY FLASHLIGHT** has a red signal wand extending out over the lens. The red hood itself is said to be visible for half a mile and does not obstruct the flashlight's white beam. The wand is available in three- or five-inch lengths.

Science News Letter, July 26, 1958

❁ **PORTABLE ELECTRIC JIGSAW** can cut through two-inch wood and one-eighth-inch steel. Weighing four pounds, the jigsaw has a cast-in blower vent to aid cutting accuracy. It also has a tilting base and angle index for cutting angles to 45 degrees on either side of the line of cut.

Science News Letter, July 26, 1958

❁ **STOVE GUARD** is designed to reduce the danger of burns and scalds while cooking. This British invention consists of two plates designed to be attached to the sides of a stove and project a little above the cooking surface. Each plate has six slide sockets to contain the handles of pots and pans.

Science News Letter, July 26, 1958

❁ **TEST TUBE HOLDERS** made of plastic are designed in different sizes to accommodate tubes ranging from semi-micro to very large. The largest rack can also hold



centrifuge tubes, dropping bottles, and vials. The polyethylene racks, shown in the photograph, are described as being almost unbreakable and easily cleaned by washing.

Science News Letter, July 26, 1958

❁ **DOWN SPOUT ATTACHMENT** takes rain water away from the house foundation. It is 48 inches long and seven inches wide

and is in the form of a coiled, flat garden hose. The down spout extension can be attached to round or rectangular spouts.

Science News Letter, July 26, 1958

❁ **ZIPPERED SLEEVING** permits accessibility for repair of electrical wiring. The plastic sleeve is extruded from vinyl resins and the zipper is heat sealed to the sheeting. It is easily opened and folded back to expose wires for marking, splicing or soldering.

Science News Letter, July 26, 1958

❁ **PLASTIC SYPHON** has a built-in self-starter. The syphon consists of a semi-rigid "U" tube that has an open end and a flexible "squeeze" bulb attached to the other end. The bulb has a stopcock outlet. The syphon is available in two sizes.

Science News Letter, July 26, 1958

❁ **MAGAZINE-LOADED AIR TACKER** is described as forming and driving staples with machine-gun speed. The stapler has a plastic throw-away magazine. All that is necessary is to insert the magazine, loaded with pre-cut staple-forming wires, and fire away. The machine throws out 5,000 staples without reloading.

Science News Letter, July 26, 1958



Nature Ramblings



By BENITA TALL

► NOW THAT midsummer is here, each week end thousands of Americans are getting together with family and friends and going off for a picnic.

No matter where they go, to the woods or out in the backyard, the picnickers are usually joined by some six-legged picnickers.

Ants have been described as "social" insects. The thousands of Americans who spread their food out on picnic tables or on cloths on the ground can only agree. Unfortunately, the ants seem to want to socialize with humans who may wonder if the ant has any other source of food.

Scientists are also interested in the ants' food habits. How these insects find their food, their methods of feeding the young, special kinds of food, variations in feeding,

Food for Ants



all are factors in the development of this social insect.

One group of ants particularly interests scientists because of its anti-social habit of cannibalism!

The Australian bulldog and "jumper" ants of the genus *Myrmecia* are believed to be the most primitive, in form or morphology, among the ants. While the more highly social species of ants feed one another and the young or larvae by regurgitating liquid

food from their crops, the primitive *Myrmecia* eat other insects, their own ant eggs, and sometimes one another.

Studies of colonies of *Myrmecia* show that the workers and queens have a highly adaptive form of egg-laying. Eggs are offered to larvae of all sizes, even when they are at the stage where they eat insects. Adults, including the queen, also eat the eggs. Some of the ants have even been observed to beg or steal an egg from a hungry larva. A worker ant may even induce another worker to lay an egg for him.

Workers have been seen assisting larvae by turning the egg, held in the mandibles, so that the young could more easily get at the contents.

For primitive insects, the *Myrmecia* manage to eat well.

Science News Letter, July 26, 1958

